

CLAIMS

1. A piezoelectric element including an upper electrode, a piezoelectric and/or electrostrictive material and a lower electrode, characterized in that
5 the piezoelectric and/or electrostrictive material is a composite oxide constituted by ABO_3 as general formula and the piezoelectric and/or electrostrictive material has a twin crystal.

2. A piezoelectric element according to claim 1,
10 wherein the twin crystal has a twin crystal plane selected from a group represented by $\{110\}$.

3. A piezoelectric element according to claim 1, wherein the twin crystal has a twin crystal plane selected from a group represented by $\{100\}$.

15 4. A piezoelectric element according to claim 2, wherein the piezoelectric and/or electrostrictive material is a tetragonal crystal.

5. A piezoelectric element according to claim 2, wherein the piezoelectric and/or electrostrictive
20 material is a rhombic crystal.

6. A piezoelectric element according to claim 2, wherein the piezoelectric and/or electrostrictive material is a rhombohedral crystal.

7. A piezoelectric element according to claim 1,
25 wherein the piezoelectric and/or electrostrictive material has a twin crystal rate from 0.001 to 1.0.

8. A piezoelectric element according to claim 1,

wherein the piezoelectric and/or electrostrictive material has an orientation property.

9. A piezoelectric element according to claim 8, wherein the piezoelectric and/or electrostrictive material has an orientation rate of 99 % or higher in a direction of at least an axis.

10. A piezoelectric element according to claim 8, wherein the piezoelectric and/or electrostrictive material has a principal crystal plane, in contact with the upper electrode, of {100}.

11. A piezoelectric element according to claim 8, wherein the piezoelectric and/or electrostrictive material has a principal crystal plane, in contact with the upper electrode, of {111}.

12. A piezoelectric element according to claim 8, wherein the piezoelectric and/or electrostrictive material has a principal crystal plane, in contact with the upper electrode, of {110}.

13. A piezoelectric element according to claim 1, wherein the lower electrode and the piezoelectric and/or electrostrictive material are directly formed on the substrate.

14. A piezoelectric element according to claim 13, wherein a layer including the piezoelectric and/or electrostrictive material is formed with a thickness of 1 to 10 μm .

15. A piezoelectric actuator employing a piezoelectric element according to claim 1.

16. An ink jet recording head employing a piezoelectric element according to claim 1.